

Sub B1  
cont.

a polyol component including a randomly polymerized polyether polyol having at least 75 percent by weight of propylene oxide repeat units and having a high secondary hydroxyl group content of about 51 to about 100 percent based on the total number of hydroxyl group present in said high secondary polyether polyols;

a polyisocyanate;

a chain extender; and

a polyurethane catalyst,

and wherein said thermoplastic polyurethane has a molecular weight of from

about 75,000 to about 400,000 weight average.

Sub B2  
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3. The thermoplastic polyurethane according to claim 1, wherein said polyol component has a number average molecular weight of from about 600 to about 5,000, and wherein said polyol component has a hydroxyl functionality of from about 1.8 to about 2.2.

8. The thermoplastic polyurethane according to claim 3, wherein said thermoplastic polyurethane has a molecular weight from about 125,000 to about 300,000, wherein said high secondary polyether polyol has a secondary hydroxyl group content of about 65 to about 90%, and wherein the mole ratio of polyisocyanate functional groups to hydroxyl functional groups of the polyol component and the chain extender is from about 0.98 to about 1.03.

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cont.

9. The thermoplastic polyurethane according to claim 1, wherein said polyol component has hydroxyl functionality of from about 1.95 to about 2.05.

10. The thermoplastic polyurethane according to claim 1, wherein said polyol component includes less than or equal to 15 weight percent of said polyol having low secondary hydroxyl group content, and wherein said polyurethane catalyst is present in an amount from about 20 to about 500 parts by weight per million parts by weight of the total weight of said polyisocyanate, said polyol component, and said chain extender.

A3,   
Cmld 11. The thermoplastic polyurethane according to claim 1, wherein said thermoplastic polyurethane has a molecular weight from about 150,000 to about 250,000.

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Sub B3  
A4 16. A polyurethane composition, comprising:  
a polyol component including a randomly polymerized polyether polyol having at least 75 percent by weight of propylene oxide repeat units and having a high secondary hydroxyl group content of about 51 to about 100 percent based on the total number of hydroxyl groups present in said high secondary polyether polyol,  
a polyisocyanate;  
a chain extender; and  
a polyurethane catalyst,  
said polyurethane being a thermoplastic substantially free of cross-links,  
and wherein said thermoplastic polyurethane has a molecular weight of from about 75,000 to about 400,000 weight average.

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Sub B4  
A3 18. The polyurethane composition according to claim 16, wherein said polyol component has a number average molecular weight of from about 600 to about 5,000, and wherein said polyol component has hydroxyl functionality of from about 1.8 to about 2.2.

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23. The polyurethane composition according to claim 18, wherein said thermoplastic polyurethane has a molecular weight from about 125,000 to about 300,000, wherein said high secondary polyether polyol has a secondary hydroxyl group content of about 65 to about 90%, and wherein the mole ratio of polyisocyanate functional groups to the total hydroxyl functional groups of the polyol component and the chain extender is from about 0.98 to about 1.03.

24. The polyurethane composition according to claim 16, wherein said polyol component has a hydroxyl functionality of from about 1.95 to about 2.05.

25. The polyurethane composition according to claim 16, wherein said polyol component includes less than or equal to 15 weight percent of said polyol having low secondary

hydroxyl group content, and wherein said polyurethane catalyst is present in an amount from about 20 to about 500 parts by weight per million parts by weight of the total weight of said polyisocyanate, said polyol component, and said chain extender.

26. The polyurethane composition according to claim 16, wherein said thermoplastic polyurethane has a molecular weight from about 150,000 to about 250,000.

31. A process for preparing a thermoplastic polyurethane composition, comprising:  
reacting in substantially a single step a composition comprising:  
a polyol component including a randomly polymerized polyether polyol having at least 75 percent by weight of propylene oxide repeat units and having a high secondary hydroxyl group content of about 51 to about 100 percent based on the total number of hydroxyl group present in said polyether polyol;  
a polyisocyanate;  
a chain extender; and  
a polyurethane catalyst,  
wherein said thermoplastic polyurethane is substantially linear, and wherein said thermoplastic polyurethane has a molecular weight of from about 75,000 to about 400,000 weight average.

33. The process for preparing a thermoplastic polyurethane composition according to claim 31, wherein said polyol component has a number average molecular weight of from about 600 to about 5,000, and wherein said polyol component has hydroxyl functionality of from about 1.8 to about 2.2.

38. The process for preparing a thermoplastic polyurethane composition according to claim 33, wherein said thermoplastic polyurethane has a molecular weight from about 125,000 to about 300,000, wherein said high secondary polyether polyol has a secondary hydroxyl group content of about 65 to about 90%, and wherein the mole ratio of polyisocyanate functional